APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/053,490	10/26/2001	Kobby Pick	10559-454001/P10771	3410

20985	7590	11/07/2006

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EXAMINER
PHU, PHUONG M

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 11/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/053,490	PICK ET AL.
	Examiner	Art Unit	
	Phuong Phu	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>14 September 2006</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-28</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) <u>19-23</u> is/are allowed.

6) ☒ Claim(s) <u>1,3-14, 16-18, 24, 25, 27 and 28</u> is/are rejected.

7) ☒ Claim(s) <u>2, 15 and 26</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a) ☐ All   b) ☐ Some *   c) ☐ None of:

         1. ☐ Certified copies of the priority documents have been received.

         2. ☐ Certified copies of the priority documents have been received in Application No. _____.

         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1.　　In view of the Appeal Brief filed on 9/14/06, PROSECUTION IS HEREBY

REOPENED.　Accordingly, a non-final Office Action is set forth below.

Claim Rejections - 35 USC § 103

2.　　The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

3.　　Claims 1, 3-14, 16-18, 24, 25, 27 and 28 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Gonzalez et al (2002/0181624), (previously cited), in view of Sriram et al

(6,754,251), (previously cited), and Miller et al (5,930,231), (newly-cited).

-Regarding to claim 1, see figure 2 and sections [0021-0048], Gonzalez et al discloses a

method comprising:

　　　　step (12, 14, 16) of determining a normalization factor (outputted from (14)); and

　　　　step (16) of applying the normalization factor to an output (y) of a receiver (10).

　　　　Gonzalez et al does not disclose determining the normalization factor by using a

determined variance of a multiple access interference, as claimed.

　　　　However, Gonzalez et al teaches that the normalization factor is determined by being

based on a variance (σ^2) of noise which has a Gaussian distribution (see [009, 0030]). Gonzalez

et al further teaches that the method can be employed in CDMA (code-division-multiple-access)

receivers (see [0004,0007]).

Sriram et al teaches that noise received by a CDMA receiver has a Gaussian distribution, and the noise is subject to comprise thermal noise, inter and intra-cell interference, and cross correlation among different PN sequences or their shifts (see col. 18, lines 7-18), wherein the cross correlation among different PN sequences or their shifts, (namely, multiple access interference), has a Gaussian distribution (see col. 18, lines 34-37), and the thermal noise inherently has a Gaussian distribution (for clarifying this inherency, see Sklar, "Digital Communications Fundamentals and Applications", page 30).

Therefore, for Gonzalez et al application in a CDMA receiver of a CDMA system, which simply comprises a single communication cell and utilizes a plurality of different PN sequences, the noise received by said CDMA receiver is subject to comprise thermal noise and cross correlation among the different PN sequences or their shifts, (note that in this situation of a single communication cell, inter and intra-cell interference is zero or does not exist).

For said application, it would have been obvious for one skilled in the art to determine/calculate Gonzalez et al variance (σ^2) of noise in such a way that the noise would be calculated to comprise thermal noise and cross correlation among the different PN sequences or their shifts, as taught by Sriram et al, in order to indicate them as a true noise being received at the CDMA receiver.

Miller et al teaches that for a source comprising of a plurality of sub-sources being combined into an equivalent Gaussian distribution, wherein each individual of sub-sources has a Gaussian distribution, then the variance of the source is equal to the sum total variance of all the sub-sources which have the same shape (Gaussian) distribution (see col. 27, lines 44-50).

Since Gonzalez et al in view of Sriram et al does not teach in detail how the variance (σ^2) of noise is determined/calculated in terms of thermal noise and cross correlation among the different PN sequences or their shifts, it would have been obvious for one skilled in the art to determine/calculate Gonzalez et al variance (σ^2) of noise, in view of Sriram et al, to be equal to the sum of variance of thermal noise and variance of cross correlation among the different PN sequences or their shifts, as taught by Miller et al, so that the variance (σ^2) of noise would be determined as required.

Therefore, with such the above implementation, Gonzalez et al in view of Sriram et al and Miller et al teaches determining the normalization factor by using a determined variance of cross correlation among the different PN sequences or their shifts, or namely, a determined variance of a multiple access interference, as claimed.

-Regarding to claim 3, Gonzalez et al discloses step (16, 18) of obtaining a metric correction factor (outputted from (18)) using the normalization factor (see figure 2).

-Regarding to claim 4, Gonzalez et al discloses step (18) of providing the metric correction factor to a channel decoder (20) (see figure 2 and section [0048]).

-Regarding to claim 8, Gonzalez et al discloses that the receiver employing a detection (demodulator) to obtain the output of the receiver for CDMA communications (see figure 2), (note that this detection is accounted for the claimed limitation "multi-user detection").

-Regarding to claim 9, as similarly applied to claims 1, 3, 4 and 8, set forth above and herein incorporated, see figure 2 and sections [0021-0048], Gonzalez et al discloses a system comprising:

a detector (demodulator, 10) which receives transmitted information and provides one or

more output symbols based on the transmitted information;

a metric correction section (12, 14, 16, 18) which normalizes the one or more output

symbols to obtain a metric (outputted from (12)); and

a channel decoder(18, 20) which receives the metric from the metric correction section,

the channel decoder utilizing the metric to decode the transmitted information (see figure 2 and

section [0048]).

Gonzalez et al does not disclose the normalization is carried out by basing on a variance

of a multiple access interference, as claimed.

However, Gonzalez et al teaches that the normalization factor is determined by being

based on a variance (σ^2) of noise which has a Gaussian distribution (see [009, 0030]). Gonzalez

et al further teaches that the method can be employed in CDMA (code-division-multiple-access)

receivers (see [0004,0007]).

Sriram et al teaches that noise received by a CDMA receiver has a Gaussian distribution,

and the noise is subject to comprise thermal noise, inter and intra-cell interference, and cross

correlation among different PN sequences or their shifts (see col. 18, lines 7-18), wherein the

cross correlation among different PN sequences or their shifts, (namely, multiple access

interference), has a Gaussian distribution (see col. 18, lines 34-37), and the thermal noise

inherently has a Gaussian distribution.

Therefore, for Gonzalez et al application in a CDMA receiver of a CDMA system, which

simply comprises a single communication cell and utilizes a plurality of different PN sequences,

the noise received by said CDMA receiver is subject to comprise thermal noise and cross

correlation among the different PN sequences or their shifts, (note that in this situation of a single communication cell, inter and intra-cell interference is zero or does not exist).

For said application, it would have been obvious for one skilled in the art to determine/calculate Gonzalez et al variance (σ^2) of noise in such a way that the noise would be calculated to comprise thermal noise and cross correlation among the different PN sequences or their shifts, as taught by Sriram et al, in order to indicate them as a true noise being received at the CDMA receiver.

Miller et al teaches that for a source comprising of a plurality of sub-sources being combined into an equivalent Gaussian distribution, wherein each individual of sub-sources has a Gaussian distribution, then the variance of the source is equal to the sum total variance of all the sub-sources which have the same shape (Gaussian) distribution (see col. 27, lines 44-50).

Since Gonzalez et al in view of Sriram et al does not teach in detail how the variance (σ^2) of noise is determined/calculated in terms of thermal noise and cross correlation among the different PN sequences or their shifts, it would have been obvious for one skilled in the art to determine/calculate Gonzalez et al variance (σ^2) of noise, in view of Sriram et al, to be equal to the sum of variance of thermal noise and variance of cross correlation among the different PN sequences or their shifts, as taught by Miller et al, so that the variance (σ^2) of noise would be determined as required.

Therefore, with such the above implementation, Gonzalez et al in view of Sriram et al and Miller et al teaches determining the normalization factor by using a determined variance of cross correlation among the different PN sequences or their shifts, or namely, a determined variance of a multiple access interference, as claimed.

-Regarding to claims 10, 11 and 14, in Gonzalez et al, the detector can be configured to obtain the output of the receiver for CDMA communications by using plural of processing paths (see figure 2, [0004, 0005]), (note that this detector is accounted for the claimed limitations "multi-user detector" of claim 10, "rake detector" of claim 11, and "long code CDMA detector" of claim 14).

-Regarding to claim 12, Gonzalez et al discloses that the metric is based on a ratio (see equation 6), (note that this ratio is accounted for the claimed limitation "log likelihood ratio").

-Regarding to claim 13, Gonzalez et al discloses that the metric correction section comprises means (14, 16) which determines a normalization factor (outputted from (14) to apply to the output symbols of the detector (see figure 2).

-Regarding to claims 5, 16, Gonzalez et al discloses step/means (12) determining LLR $\lambda(y)$, as the LLR(n) as claimed (see section [0030] and equation (6)) wherein:

$$\lambda(y) = (2a*y)/\sigma^2 , \text{ where}$$

y is the detected output of an input symbol being demodulated by demodulator to provide the detected output (see figure 2),

a or a* is a time varying gain "channel gain" associated with a symbol y (see figure 2, [0005, 0006], (which is considered here equivalent with the limitation "time varying gain associated with the desired symbol"), and

σ^2 is noise variance, (which is considered here equivalent with the limitation "total noise variance").

-Regarding to claims 6, 7, 17, 18, as applied for claims 1 and 9, Gonzalez et al, in view of Sriram et al and Miller et al, discloses step/means of determining the variance of multiple

access interference, (note that each of the claimed limitations "determining the variance of

multiple access interference analytically" of claim 6, and "determining the variance of multiple

access interference empirically" of claim 7 is given here a broad meaning as "determining the

variance of multiple access interference , and each of the claimed limitations "the variance of

the multiple access interference is determined analytically" of claim 17 and limitations "the

variance of the multiple access interference is determined empirically" of claim 18 is given here

a broad meaning as "the variance of the multiple access interference is determined").

-Regarding to claim 24, as similarly applied to claims 1, 3, 4 and 8, set forth above and

herein incorporated, see figure 2 and sections [0021-0048], Gonzalez et al discloses a method

comprising:

step (10) of receiving an symbol;

step (12, 14) of determining a normalization factor for the symbol;

step (16) of normalizing the symbol with the normalization factor; and

step (18, 20) of providing the normalized symbol to a channel decoder (20).

Gonzalez et al does not disclose the normalization factor is determined by using a

variance of a level of multiple access interference for the symbol, as claimed, (note that the

claimed limitation "determining a normalization factor for the symbol using a determined

variance in a level of multiple access interference for the symbol" is interpreted here as

"determining a normalization factor for the symbol using a determined variance of multiple

access interference for the symbol").

However, Gonzalez et al teaches that the normalization factor is determined by being

based on a variance (σ^2) of noise which has a Gaussian distribution (see [009, 0030]). Gonzalez

et al further teaches that the method can be employed in CDMA (code-division-multiple-access)

receivers (see [0004,0007]).

Sriram et al teaches that noise received by a CDMA receiver has a Gaussian distribution,

and the noise is subject to comprise thermal noise, inter and intra-cell interference, and cross

correlation among different PN sequences or their shifts (see col. 18, lines 7-18), wherein the

cross correlation among different PN sequences or their shifts, (namely, multiple access

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inherently has a Gaussian distribution.

Therefore, for Gonzalez et al application in a CDMA receiver of a CDMA system, which

simply comprises a single communication cell and utilizes a plurality of different PN sequences,

the noise received by said CDMA receiver is subject to comprise thermal noise and cross

correlation among the different PN sequences or their shifts, (note that in this situation of a

single communication cell, inter and intra-cell interference is zero or does not exist).

For said application, it would have been obvious for one skilled in the art to

determine/calculate Gonzalez et al variance (σ^2) of noise in such a way that the noise would be

calculated to comprise thermal noise and cross correlation among the different PN sequences or

their shifts, as taught by Sriram et al, in order to indicate them as a true noise being received at

the CDMA receiver.

Miller et al teaches that for a source comprising of a plurality of sub-sources being

combined into an equivalent Gaussian distribution, wherein each individual of sub-sources has a

Gaussian distribution, then the variance of the source is equal to the sum total variance of all the

sub-sources which have the same shape (Gaussian) distribution (see col. 27, lines 44-50).

Since Gonzalez et al in view of Sriram et al does not teach in detail how the variance (σ^2) of noise is determined/calculated in terms of thermal noise and cross correlation among the different PN sequences or their shifts, it would have been obvious for one skilled in the art to determine/calculate Gonzalez et al variance (σ^2) of noise, in view of Sriram et al, to be equal to the sum of variance of thermal noise and variance of cross correlation among the different PN sequences or their shifts, as taught by Miller et al, so that the variance (σ^2) of noise would be determined as required.

Therefore, with such the above implementation, Gonzalez et al in view of Sriram et al and Miller et al teaches determining the normalization factor by using a determined variance of cross correlation among the different PN sequences or their shifts, or namely, a determined variance of a multiple access interference, as claimed.

-Regarding to claim 25, as applied for claim 24, Gonzalez et al in view Sriram et al and Miller et al discloses step of determining a time varying gain (outputted from (14) associated with a desired symbol (see Gonzalez et al, figure 2); and step (12) of determining the variance in the level multiple access interference for the symbol (see Gonzalez et al, figure 2, as being applied to claim 24, in view of Sriram et al and Miller et al).

-Regarding to claim 27, Gonzalez et al discloses that normalizing the symbol with the normalization factor comprises step (16) multiplying the symbol (outputted from (10) by a log likelihood ratio (outputted from (12, 14) (see figure 2).

-Claim 28 is rejected with similar reasons set forth for claims 5 and 16.

Allowable Subject Matter

4.   Claims 19-23 are allowed.

5.   Claims 2, 15 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6.   Applicant's arguments filed on 9/14/06 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Phu whose telephone number is 571-272-3009. The examiner can normally be reached on M-F (8:00 AM - 4:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 2611

PHUONG PHU
PRIMARY EXAMINER

phuong phu

Phuong Phu
10/31/06

Phuong Phu
Primary Examiner
Art Unit 2611